

**Notice of Allowability**

Application No.

10/727,187

Applicant(s)

JACK ET AL.

Examiner

Art Unit

Faye Boosalis

2884

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to submission of 22 August 2006.
2. ☒ The allowed claim(s) is/are 1,3,4,6-10 and 12-16.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

## EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

### ***Comment on Submissions***

1. This communication is responsive to submissions 22 August 2006.

### ***Allowable Subject Matter***

1. Claims 10 and 12-16 were previously allowed in the Office Action of 1 June 2006.
2. Claims 1, 3-4, 6-9 is allowed.
3. The following is a statement of reasons for the indication of allowable subject matter:

Regarding independent claim 1, the prior art does not disclose or fairly suggest a radiation sensor comprising a buffer layer wherein the buffer layer defines a thermal conductivity that is less than one order of magnitude greater than a thermal conductivity defined by the superconductive layer (YBCO).

The examiner notes that while it is known in the art a radiation sensor comprising: a substrate (Si) defining a cavity (etch pitch) (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 98, lines 2 of 3<sup>rd</sup> paragraph); an antenna supported by the substrate (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1a and page 99, 1<sup>st</sup> paragraph under the heading "Design"); a thermal detector unit (i.e. microbolometer) spaced from the antenna and from the substrate (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1b and 3b); a plurality of multi-layered conductive leads comprises a superconductive layer

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(YBCO) in electrical contact with the thermal detector unit and the antenna, a support layer (YSZ) between the superconductive layer and the substrate (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 99 1<sup>st</sup> paragraph under the heading "Design"), and a buffer layer (CeO<sub>2</sub>) disposed between the support layer and the superconductive layer, each of the support layers cooperating to suspend the thermal detector unit over the cavity (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 102 1<sup>st</sup> paragraph and 2<sup>nd</sup> paragraph under the heading "Fabrication"), the prior art does not suggest a thermal conductivity, of the buffer layer, between the support layer and the superconductive layer, being less than one order of magnitude greater than a thermal conductivity defined by the semiconductor layer.

Regarding independent claim 8, the prior art does not disclose or fairly suggest in a radiation sensor for measuring incident radiation comprising: a buffer layer defining a thermal conductivity that is less than one order of magnitude greater than a thermal conductivity defined by the superconductive layer.

The examiner notes that while it is known in the art of a radiation sensor for measuring incident radiation comprising a substrate (Si) defining a cavity (etch pitch) (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 98, lines 2 of 3<sup>rd</sup> paragraph); a thermal detector unit (i.e. microbolometer) disposed above the cavity (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer*

on Silicon," Fig. 1b and 3b), an antenna coupled to the substrate (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1a and page 99, 1<sup>st</sup> paragraph under the heading "Design"); and a plurality of conductors in contact with the antenna and the thermal detector unit, the improvement comprising: each of the plurality of conductors defining a plurality of layers and comprising: a superconductor layer (YBCO); a support layer (YSZ) between the conductive layer and the substrate (Si); and a buffer layer (CeO<sub>2</sub>) between the support layer and the superconductive layer (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1b and 3b and page 99 1<sup>st</sup> paragraph under the heading "Design"); wherein each of the support layers cooperate to suspend the thermal detector unit over the cavity (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 102 1<sup>st</sup> paragraph and 2<sup>nd</sup> paragraph under the heading "Fabrication"), the prior art does not suggest a thermal conductivity, of the buffer layer, being less than one order of magnitude greater than a thermal conductivity defined by the superconductor layer between the support layer and the superconductive layer.

Regarding independent claim 9, the prior art does not disclose or fairly suggest in a radiation sensor for measuring incident radiation comprising: a buffer layer defining a thermal conductivity  $K < 0.1 \text{ W/cm-K}$ .

The examiner notes that while it is known in the art of a radiation sensor for measuring incident radiation comprising a substrate (Si) defining a cavity (etch pitch)

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(see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 98, lines 2 of 3<sup>rd</sup> paragraph); a thermal detector unit (i.e. microbolometer) disposed above the cavity (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1b and 3b), an antenna coupled to the substrate (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1a and page 99, 1<sup>st</sup> paragraph under the heading "Design"); and a plurality of conductors in contact with the antenna and the thermal detector unit, the improvement comprising: each of the plurality of conductors defining a multi-layer structure comprising: a support layer (YSZ) adjacent to the substrate; a superconductor layer (YBCO) opposite the substrate; and a buffer layer ( $\text{CeO}_2$ ) between the support layer and the superconductive layer (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* Fig. 1b and 3b and page 99 1<sup>st</sup> paragraph under the heading "Design"); wherein each of the support layers cooperate to suspend the thermal detector unit over the cavity (see for example *Rice et al. "Journal paper entitled "High-Tc Superconducting Antenna-coupled Microbolometer on Silicon,"* page 102 1<sup>st</sup> paragraph and 2<sup>nd</sup> paragraph under the heading "Fabrication"), the prior art does not suggest a thermal conductivity of  $K < 0.1 \text{ W/cm-K}$  defined by the buffer layer between the support layer and the superconductive layer.

The remaining claims 2-11, 13-16 and 18-20 are allowable based on its dependency.

**Conclusion**

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faye Boosalis whose telephone number is 571-272-2447. The examiner can normally be reached on Monday thru Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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